REMARKS

The Invention.

The present invention relates to novel enzymes which share certain conserved sequences with EGIII from *Trichoderma reesei*. These EG III like cellulases comprise an amino acid sequence comprising therein an amino acid string selected from the group consisting of:

(a) Asn-Asn-(Leu/Phe/Lys/Ile)-Trp-Gly

(b) Glu-(Leu/Phe/Ile)-Met-Ile-Trp

(c) Gly-Thr-Glu-Pro-Phe-Thr;

(d) (Ser/Tyr/Cys/Trp/Thr/Asn/Lys/Arg)-(Val/Pro)-(Lys/Ala)-(Ser/Ala)-(Tyr/Phe);

(e) Lys-Asn-Phe-Phe-Asn-Tyr.

Status of the Application.

Claims 1-13 and 24-29 are pending in the application. In response to a Restriction Requirement Claims 14-23 were cancelled as drawn to a non-elected invention without prejudice. Claims 12, 13 and 24 are cancelled by the present amendment. Applicants reserved the right to file further continuation applications on any subject matter disclosed in the instant application or on the subject matter of any previously or presently cancelled claim. Claim 30 is new and finds support in the claims as originally filed (see original claim 28). Claims 1 and 25-29 have been amended to more clearly and distinctly claim what is considered the invention and to bring the claims into conformance with US Patent Practice. Applicants assert new matter has not been introduced by the amendment.

Election/Restriction.

Claims 14-23 have been withdrawn by the Examiner as being drawn to a non-elected invention. As noted above, Applicants previously cancelled Claims 14-23 in their response to the Restriction Requirement. However, for clarity and completeness,

Applicants hereby cancel Claims 14-23 without prejudice. Applicants reserve the right to pursue the originally filed, similar and/or broader Claims in the future.

Specification.

The disclosure was objected to as missing Figure 5. The Examiner asserts that two copies of Figure 4 were sent, with one being labeled "4/5" and the other "5/12" (see page 3 of the Office Action dated August 26, 2003). Applicants hereby submit replacement pages for Figures 2,4, and 5, a total of six pages. In addition, annotated pages are also provided. Withdrawal of the objection is respectfully requested.

35 U.S.C. §112, first paragraph.

Claims 1-13 and 24-29 stand rejected under 35 USC §112, first paragraph as failing to be described in the specification. Specifically, the Examiner asserts that the specification teaches that certain primers were used to obtain certain peptides but that the specification does not enable one of ordinary skill in the art to make and/or use embodiment other than the specific peptides listed on pages 4 and 5 of the Office Action. Applicant respectfully traverses.

In addition, Claims 1-13 and 24-29 stand rejected under 35 USC §112, first paragraph as allegedly containing subject which was not described in the specification in such a way as to convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant respectfully traverses.

It is well settled that "[t]he first paragraph of section 112 requires nothing more than objective enablement. How such a teaching is set forth, either by the use of illustrative examples or by broad terminology, is of no importance." *In re Marzocchi*, 169 USPQ 367, 369 (CCPA 1971). Moreover, "a specification disclosure which contains a teaching of the manner and process of making and using the invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented must be taken as in compliance with the enabling requirement of the first paragraph of section 112 unless there is reason to doubt the objective truth of the

statements contained therein which must be relied on for enabling support." *In re Marzocchi*, 169 USPQ at 369.

Indeed, as indicated previously, Applicant must respectfully disagree with the Examiner's argument and rationale, as the present Specification teaches how to identify cellulases (*See e.g.*, pages 9-11 of the Specification), as well as how to produce the identified cellulase (*See e.g.*, pages 14, line 25 - page 20, line 5 of the Specification). Applicant respectfully submits that both the structure and function of the cellulases claimed are provided in the Specification, as the amino acid sequence (base structure) and function (cellulolytic activity) are well-described throughout the Specification.

The fact that experimentation may be complex does not necessarily make it undue, if the art engages in such experimentation (MPEP 2164.01 and cites therein). Applicants submit that by teaching how to identify cellulases encompassed by the claims, more than sufficient teaching is provided as to how to make and use the present invention. Indeed, as the MPEP states at 2164.01(b):

> As long as the specification discloses at least one method for making and using the claimed invention that bears reasonable correlation to the entire scope of the claim, then the enablement requirement of 35 U.S.C. 112 is satisfied. *In re Fisher*, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970). Failure to disclose other methods by which the claimed invention may be made does not render a claim invalid under 35 U.S.C. 112. *Spectra-Physics, Inc. v. Coherent, Inc*, 827 F.2d 1524, 1533, 3 USPQ2d 1737, 1743 (Fed. Cir.), *cert. denied*, 484 U.S. 954 (1987).

Thus, the fact that Applicants do not explicitly provide examples regarding every enzyme that finds use with the present invention does not render the present claims unpatentable. Indeed, "a patent need not teach, and preferably omits what is well known in the art" (*See e.g.*, *In re Buchner*, 929 F.2d 660, 661; MPEP 2164.01). Applicants submit that the Specification provides what is needed so that use of the methods is well within the skill of those in the art. Indeed, because the Specification explicitly discloses how to identify and use several exemplary proteins using methods described in the Specification, the Claims are enabled. Thus, Applicants respectfully request that this rejection be withdrawn.

35 U.S.C. §112, second paragraph.

Claims 2 and 24-28 are rejected under 35 USC §112, second paragraph as failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants respectfully traverse each of the rejections.

Specifically, the Examiner asserts that the recitation of "derived from" in Claim 2 is indefinite and confusing. Applicants believe the term is clear. Derive means "to take, receive, or obtain especially from a specified source." Thus, one skilled in the art would understand that the cellulase is obtained from a fungus, bacteria or Actinomycete. Withdrawal is respectfully requested.

Claim 24 depends from a cancelled claim. Claim 24 has been cancelled rendering this rejection moot.

Claims 25-28 are drawn to use claims. Claims 25-28 have been amended to be drawn to a methods of use.

Claim 28 was rejected as containing two sentences. Claim 28 has been amended to contain only a single sentence. The second sentence has been introduced as new Claim 30. The new claim is directed to stonewashing, a treatment well known in the art.

The Examiner also asserts that Claim 4 does not further limit Claim 2. Applicants respectfully disagree. Fungi are recognized in at least two broad categories – filamentous fungi and yeast. An example of the latter would be the yeast, *Saccharomyces cerevisiae.* Yeasts are fungi that grow as single cells, producing daughter cells either by budding (the budding yeasts) or by binary fission (the fission yeasts). Thus, yeast is a fungus but not a filamentous fungus and Claim 4 does futher limit Claim 2.

Based on the foregoing, Applicants respectfully request that each of the rejections under 35 USC §112, second paragraph be withdrawn.

35 U.S.C. §102

A reference that merely contains substantially the same elements or only broadly teaches the invention is insufficient to establish anticipation. *Jamesbury Corp. v. Litton*

Industrial Products, Inc., 756 F.2d 1556, 1560, 225 USPQ 253, 256 (Fed. Cir. 1985); *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir. 1983).

The claims as amended require the EGIII-like enzyme to have greater than 60% identity with T. reesei EGIII (SEQ ID NO:8).

35 U.S.C. §102(b).

Claims 1-9, 11-13 and 24 stand rejected under 35 USC §102(b) as being anticipated by Kitamoto, et al. (BB; Kitamoto et al., "Molecular cloning, purification and characterization of two endo-1, 4-beta-glucanases from Aspergillus oryzae KBN616," *Applied Microbiology and Biotechnology,* V. 46 No. 5-6, 1996 pp. 538-544) or Ooi, et al. (BE; Ooi et al., "Cloning and sequence analysis of a cDNA for cellulase (FI-CMCase) from *Aspergillus aculeatus,*' Curr. Genet., Vol. 18, pp. 217-222 (1990)). Specifically, the Examiner asserts that the Kitamoto and Ooi references teach the instant sequence, i.e, N-N-(L/F/K/I)-W-G. In addition, the Examiner states that "[i]t is impossible to tell if the enzyme of the reference s have an identity of 30% or 60% to EGIII." See page 6 of the Office Action. Applicants respectfully traverse.

With this amendment Applicants have amended Claim 1 to recite at least 60% identity with EGIII. Figure 4 of the specification provides a table with the percent similarity of the peptides in Figure 3. As can be noted, neither *Aspergillus aculeatus* (assigned number 6) nor *Aspergillus kawachii* (assigned number 5) endoglucanases (the endoglucanases in the cited references) possess this level of identity.

Applicants also provide, in Appendix II, a second alignment of the above referenced sequences that confirm that they have less than the 60% identity as recited in the claims.

Withdrawal of the rejection is respectfully requested.

35 U.S.C. §102(b or e).

Claims 1-8, 12-13 and 24 stand rejected under 35 USC §102(b or e) as being anticipated by Ward *et al.* (AG; US Patent No. 5,475,101) or Fowler *et al.* (A; US Patent

No. 5,874,276). Specifically, the Examiner asserts that the Ward and Fowler references teach the instant sequence, i.e, N-N-(L/F/K/I)-W-G. In addition, the Examiner states that "[i]t is impossible to tell if the enzyme of the references have an identity of 30% or 60% to EGIII." See page 6 of the Office Action. Applicants respectfully traverse.

Ward *et al.* fails to anticipate the claimed invention. The present claims are directed to enzymes that are obtained from an organism other than *Trichoderma*. Ward is directed to a *Trichoderma* enzyme. However, this rejection is rendered moot by the current amendment to Claim 1 wherein the EGIII like enzyme is obtained from an organism other than *Trichoderma*.

Fowler *et al.* similarly fails to anticipate the claimed invention. In case the Examiner believes that *Trichoderma longibrachiatum* is a different organism than *Trichoderma reesei*, Applicants would like to draw the Examiner's attention to page 6, line 26-27, of the instant application wherein the equivalence of *Trichoderma reesei* and *Trichoderma longibrachiatum* is noted by the phrase "*Trichoderma reesei* (*longibrachiatum*)." In addition, as noted above the instant amendments render this rejection moot.

Applicants respectfully request withdrawal of the rejection.

35 U.S.C. §103.

A *prima facie* case of obviousness requires the Examiner to cite to a combination of references which (a) suggests or motivates one of skill in the art to modify their teachings to yield the claimed invention, (b) discloses the elements of the claimed invention, **and** (c) provides a reasonable expectation of success should the claimed invention be carried out. Failure to establish **any** one of these requirements precludes a finding of a *prima facie* case of obviousness and, without more, entitles Applicants to withdrawal of the rejection of the claims in issue.[1] Applicants urge that the Examiner has failed to establish at least one of these requirements as discussed below.

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[1] *See e.g., Northern Telecom Inc. v. Datapoint Corp.*, 15 USPQ2d 1321, 1323 (Fed. Cir. 1990); and *In re Dow Chemical Co.*, 837 F.2d 469, 5 USPQ2d 1529 (Fed. Cir. 1988).

Claims 1-8, 12-13 and 24-29 stand rejected under 35 USC §103 over Ward *et al.* or Fowler *et al.* In addition, the Examiner has rejected claims 1-9, 11-13 and 24-29 as allegedly obvious over the combination of Kitamoto, *et al.* or Ooi, *et al.* in view of Ward, *et al.* or Fowler *et al.* Applicants respectfully traverse each of the rejections.

As noted above, neither Ward nor Fowler provide an enzyme from an organism other than *Trichoderma*. Combining them with any other reference fails to give the currently claimed invention. Thus, Applicant respectfully requests that this rejection be withdrawn and the Claims be passed to allowance.

CONCLUSION

In light of the above amendments, as well as the remarks, the Applicants believe the pending claims are in condition for allowance and issuance of a formal Notice of Allowance at an early date is respectfully requested. If a telephone conference would expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (650) 846-7615.

Respectfully submitted,
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Victoria L. Boyd

Date: April 1, 2005

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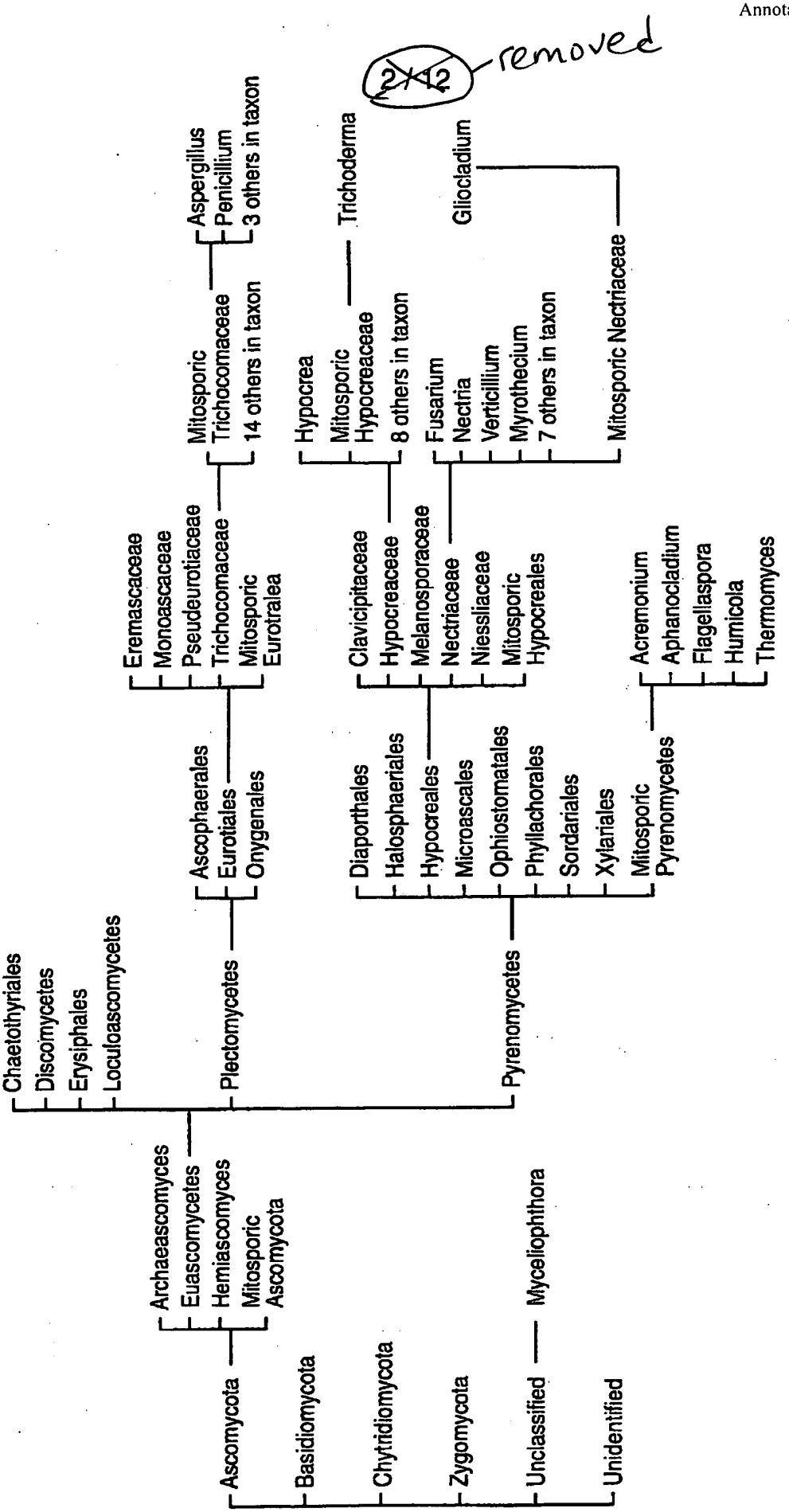
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Clavicipitaceae
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Trichoderma
8 others in taxon
Fusarium
Nectria
Verticillium
Myrothecium
7 others in taxon
Gliocladium
Mitosporic Nectriaceae

FIG._2

Percent Similarity

Percent Divergence

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1		51.0	52.9	27.0	49.0	56.9	43.1	17.6	18.6	55.9	37.0	42.2	16.7	14.7	50.0	39.1	36.9	36.0	88.9	46.1	1
2	43.1		48.5	22.5	47.1	55.9	43.3	15.4	21.2	54.4	37.0	41.3	15.4	13.5	55.2	40.2	34.5	34.0	88.9	42.3	2
3	42.6	48.5		21.3	42.2	49.0	41.7	15.5	22.3	68.9	38.0	41.7	16.5	12.6	50.0	40.2	34.5	33.0	85.2	44.7	3
4	66.7	66.3	70.6		25.8	31.5	31.5	18.0	20.2	22.5	34.8	31.5	12.4	16.9	28.1	33.3	28.6	33.7	22.2	29.2	4
5	44.6	51.0	53.5	63.1		65.7	40.2	12.7	22.5	51.0	38.0	39.2	11.8	12.7	59.4	41.4	36.9	40.0	81.5	49.0	5
6	36.6	41.2	46.5	61.9	34.3		46.1	16.7	24.5	52.0	46.0	44.1	13.7	15.7	69.8	44.8	41.7	47.0	85.2	47.1	6
7	54.5	50.5	56.3	60.5	52.5	48.5		21.2	19.2	45.6	34.0	98.1	19.2	14.4	49.0	35.6	28.6	41.0	74.1	61.5	7
8	75.0	77.7	76.3	80.0	77.2	72.8	71.0		24.0	19.4	21.0	21.2	24.0	66.3	14.6	16.1	14.3	20.0	22.2	18.3	8
9	73.5	71.0	73.7	78.6	77.6	71.4	73.7	68.3		22.3	19.0	17.3	23.8	21.2	20.8	16.1	16.7	20.0	37.0	22.1	9
10	42.6	43.7	31.1	68.2	46.5	45.5	52.4	72.0	72.7		40.0	44.7	17.5	14.6	55.2	41.4	34.5	37.0	85.2	49.5	10
11	55.2	53.1	55.1	58.8	55.2	47.9	54.5	70.3	71.9	53.1		34.0	16.0	16.0	41.7	72.4	45.2	50.0	44.4	33.0	11
12	55.4	52.4	56.3	60.5	53.5	50.5	1.9	71.0	75.8	53.4	54.5		18.3	14.4	47.9	34.5	28.6	42.0	70.4	61.5	12
13	73.1	75.8	74.5	79.7	80.6	77.4	72.3	67.0	69.5	72.3	76.9	73.4		21.2	11.5	12.6	10.7	14.0	33.3	15.4	13
14	80.4	81.9	76.3	81.2	81.5	80.4	74.2	33.7	73.1	77.4	76.9	74.2	72.0		13.5	13.8	14.3	15.0	22.2	15.4	14
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16	54.2	54.1	54.1	61.2	55.4	50.6	57.0	74.7	74.7	51.8	27.6	58.1	79.5	83.5	44.0		44.0	41.4	33.3	31.0	16
17	55.6	56.6	61.4	67.5	59.3	55.6	68.7	80.8	81.9	59.0	56.0	68.7	87.2	83.3	58.5	54.4		56.0	25.9	35.7	17
18	51.0	56.1	58.2	59.5	51.0	45.8	53.5	75.3	69.1	56.1	42.9	52.5	77.5	78.7	48.9	51.8	40.2		44.4	46.0	18
19	11.1	11.1	14.8	57.1	18.5	14.8	25.9	68.0	51.9	14.8	37.5	29.6	55.6	72.0	13.0	35.7	57.9	41.7		81.5	19
20	50.5	52.4	53.4	61.6	45.5	49.5	38.5	71.0	73.7	48.5	57.6	38.5	75.5	74.2	48.4	62.8	61.4	48.5	18.5		20
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

EG3IN.PRO
FUSEQIN.PRO
GLIOIN.PRO
ACRHYPO.PRO
ASPKAWA1.PRO
ASPACU1.PRO
HUMIN.PRO
11AG8IN.PRO
ERWCARIN.PRO
GLIO314.PRO
GLIO3HYP.PRO
HGRIS.PRO
RHMARIN.PRO
SLIVIN.PRO
PENNOT.PRO
PHANHYPO.PRO
F42HYPO.PRO
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MYCINS.PRO
CHBRAS.PRO

~~145~~ removed

handwritten numbering removed

FIGURE 4

GC516-2-PCT

Appl No. 09/284,327
Amdt. Dated Jan 15, 2004
Reply to Office Action of Oct. 16, 2003
Annotated Sheet Showing Changes

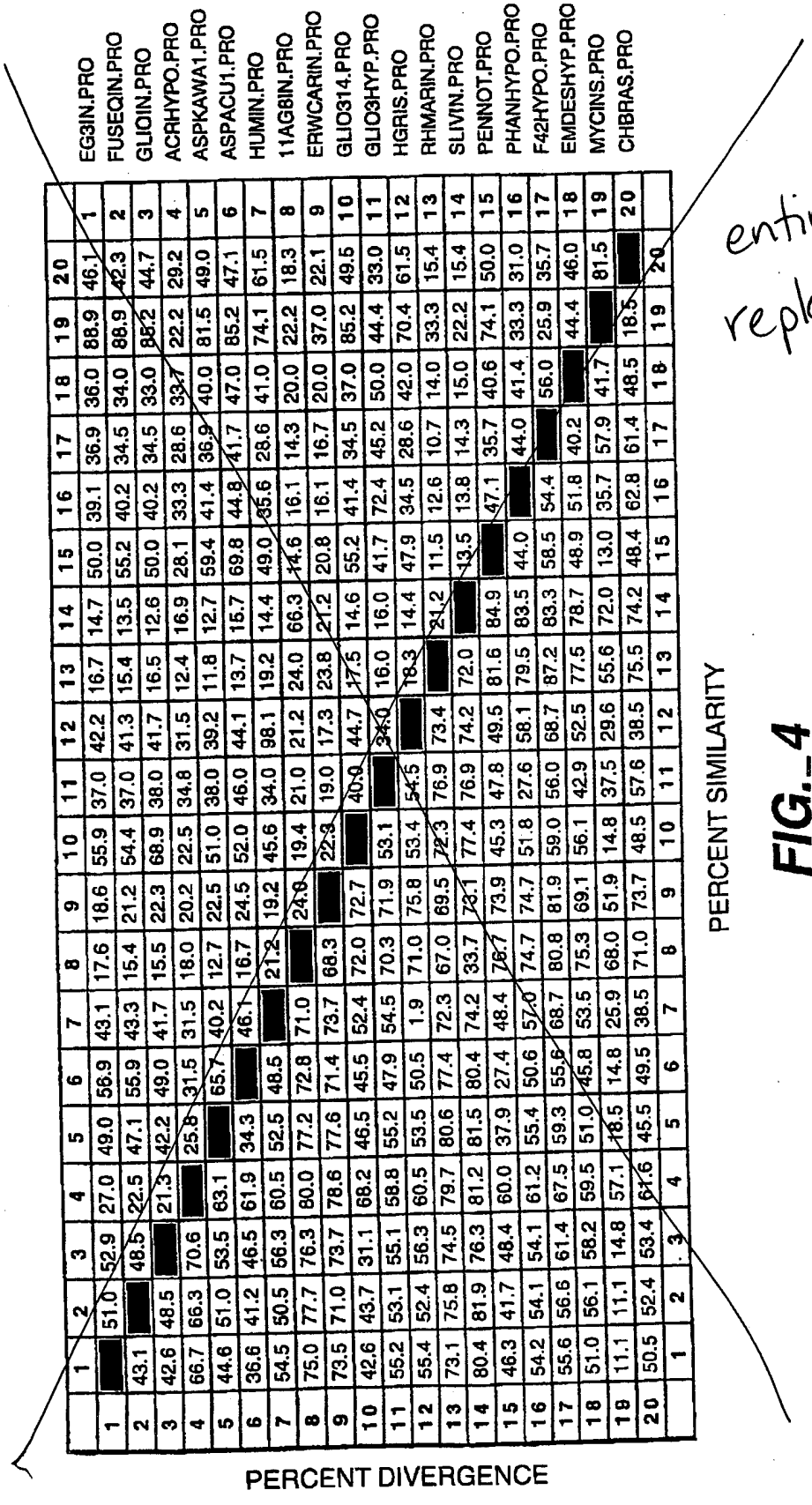

FIG._4

entire figure replaced with

Amendments to the Drawings:

The attached sheets of drawings includes Figures 2,4, and 5, a total of six pages. In Figures 2,4, and 5 the numbers at the top of the page, e.g., 2/12, have been removed. The sheet, which includes Figure 5 alone, replaces the previously filed second copy of Figure 4 (labeled 5/12 as noted by the Examiner in the Office Action dated August 26, 2003).

Attachment: Replacement Sheets for Figures 2,4, and 5.
Annotated Sheet Showing Changes

GenomeQuest

POWERED BY BIOFACET

Result Filtering Export results Export sequences Display settings

Match ◉ all of the following ○ any of the following

BLAST score | greater than | [ ]

More | Less | Reset | Apply

Display | selected | results with a limit of | all | results per page | redundant sequences ◉ group ○ do not group | results 1-2 of 2

Sequence Query (234 aa) in (GC516-2)

Result Group / Identifier	Query view / Description	E-val	Blast Score	% id Alignment	% Similar Alignment	Length Alignment	Length Subject
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BAA00435	(D00546) endo-1,4-beta-D-glucanase [Aspergillus aculeatus]						
CAA36757	(X52525) unnamed protein product [Aspergillus aculeatus]						
S12610	cellulase (EC 3.2.1.4) precursor - Aspergillus aculeatus						
☑ R1_119	[redacted]	3.526e-69	675	54.9	69.2	237	237
Q8NJY2_ASPKA	Endoglucanase.						

Select all displayed | Unselect all displayed

⊞ GUN_ASPAC | Endoglucanase I precursor (EC 3.2.1.4) (Endo-1,4-beta-glucanase) (Cellulase) (FI-CMCase). | Swiss-Prot | EBI record

⊞ BAA00435 | (D00546) endo-1,4-beta-D-glucanase [Aspergillus aculeatus] | NCBI GenPept | NCBI record

⊞ CAA36757 | (X52525) unnamed protein product [Aspergillus aculeatus] | NCBI GenPept | NCBI record

⊞ S12610 | cellulase (EC 3.2.1.4) precursor - Aspergillus aculeatus | PIR Protein Sequence Database | PIR record

⊟ ☑ R1_100 | next | top

Your query overhangs over the 5' region of this sequence.

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               ||   +| ||  ||+|| +  |||+||+||  ||++|||||  ||||  | |  | |  |
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Q:         58  ASWHADWQWSGGQNNVKSYQNSQIAIPQKRTVNSISSMPTTASWSYSGSNIRANVAYDLF  117
                ||   | ||||+|+|||| || +    |+ |+ || +|||| |||  + |||+||||||
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Q:        118  TAANPNHVTYSGDYELMIWLGKYGDIGPIGSSQGTVNVGGQSWTLYYGYNGAMQVYSFVA  177
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⊟ ☑ R1_119 | previous | top

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